

IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF PUERTO RICO

UNITED STATES OF AMERICA,

Plaintiff,

v.

HERNANDEZ-DE LA ROSA, et al.,

Defendants.

CRIM. NO. 08-037 (CCC/BJM)

**OPINION AND ORDER**

Defendant Carlos Manuel Espinal-Almeida, along with five other defendants, was arrested on January 25, 2008, and subsequently charged in a two-count indictment with (1) conspiracy to possess with intent to distribute five or more kilograms of cocaine in violation of 21 U.S.C. § 846, § 841(a)(1), and § 841(b)(1)(A)(ii); and (2) conspiracy to import from the Dominican Republic to the United States more than five kilograms of cocaine in violation of 21 U.S.C. § 963, § 952(a), § 960(a)(1), and § 960(b)(1)(B). (Docket No. 28). Espinal-Almeida submitted a motion in *limine* for exclusion of the government's ion scan evidence and related testimony, or alternatively, requesting that the court hold a hearing in accordance with Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579 (1993), to determine the admissibility of the ion scan evidence. (Docket No. 70). The government responded (Docket No. 84) and noticed its intent to use the testimony of expert witness Captain Peter J. Brown concerning the ion scan evidence, providing a copy of his curriculum vitae. (Docket No. 133). Espinal-Almeida moved for discovery in connection with the Daubert hearing (Docket No. 142) and the court ordered the government to produce the requested discovery. (Docket No. 151). Co-defendants Carlos Hernández-De La Rosa, Saturnino Tatis-Núñez and Jacobo Peguero-Carela joined Espinal-Almeida's motion in *limine*. (Docket Nos. 97, 158, 174). The government responded to Espinal-Almeida's motion for discovery and submitted a supplemental notice of its intent to use the testimony of Captain Brown. (Docket Nos. 160, 165). A Daubert hearing was held on December 16, 2008, at which Captain Brown testified, and Exhibits 1, 2, and A were admitted. (Docket Nos. 180, 182, 183). This matter was referred to me by the presiding

district judge for a hearing and disposition. (Docket No. 102).

For the reasons that follow, defendants' motion to exclude is denied.

### **FACTUAL BACKGROUND**

On or about January 26, 2008, the United States Coast Guard (the "Coast Guard") stopped and searched defendants' vessel, the El Progreso Sigue (the "El Progreso"), in international waters between the Dominican Republic and Puerto Rico. (Docket No. 68). The Coast Guard had received information that the El Progreso was involved in a sea transfer of drugs to a second vessel (the "alleged transfer vessel"). (*Id.*). During the boarding of the El Progreso, the Coast Guard conducted ion scan tests that tested positive for the presence of cocaine residue, but officers did not locate any drugs aboard the vessel. (*Id.*). The court held a Daubert hearing to determine the admissibility of the ion scan evidence and of Captain Brown's testimony relating to that evidence.<sup>1</sup>

#### **A. Captain Brown's Qualifications as an Expert**

Brown, a twenty-seven year veteran of the Coast Guard, is currently the chief of law enforcement for the Seventh Coast Guard District in Miami, Florida. (Tr. at 4). He earned bachelor's and master's degrees in chemistry in 1985 and 1991, respectively, and a law degree in 1995. (Tr. at 5). His expertise concerning ion scan technology, and particularly the Coast Guard's use of that technology, is well-established: while employed as a chemistry professor at the Coast Guard Academy, he conducted research on ion scan technology and techniques for locating drugs hidden on vessels; over the course of his career he has conducted "thousands" of ion scan tests; and he developed a training program and trained other Coast Guard members on the use of the technology. (Tr. at 6-7). He conducted research with a group composed of the Coast Guard research and development unit, the FBI, and United States and Canadian customs agencies which tested a variety of techniques and instruments, including the ion scan technology. (Tr. at 30). Brown has previously been qualified as an expert on the technology in this court and in the Southern District

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<sup>1</sup> Citations to the hearing transcript (Docket No. 192) are denoted herein as "Tr. at \_\_\_\_".

of Florida. (Tr. at 8).

**B. Scientific Theory and Acceptance of Ion Scan Technology**

According to Brown, the ion scan instrument uses the scientific process of ion mobility spectroscopy, based on the ionization process. (Tr. at 7, 15). The instrument ionizes a sample and measures the time it takes the ionized particles to travel down the drift tube in the device as compared to that of a known substance acting as a calibrant. (Tr. at 15-16). The device is optimized for cocaine, but is also capable of detecting about thirty other illegal drugs, including heroin, methamphetamine, and others. (Tr. at 17-18).

The instrument conducts an ionization test multiple times and then averages the results in a three-part analysis. (Tr. at 26). First, the “delta” represents the difference in time for the sample to pass through the instrument as compared to the known time for the substance. (Tr. at 26). In order to determine that a result positively identifies the presence of a given substance, the delta should be less than thirty microseconds.<sup>2</sup> (Tr. at 26). The peak height is a rough measure of the amount of residue detected, and a positive result should be greater than fifty.<sup>3</sup> (Tr. at 26-27). A third test provides the number of segments<sup>4</sup> which test positive for the controlled substance. Because the instrument automatically runs the test twenty times, this figure is based on the number of positive hits out of a maximum of twenty. (Tr. at 27). Brown explained that the number of segments relates to the amount of time it takes a sample to vaporize, such that when there is a large amount of residue the number of segments is larger. In order to determine a positive result, at least two consecutive windows must test positive. The lowest possible threshold for a positive test result is a delta of thirty, a peak height of fifty, and two positive segments, which would reflect less than one billionth of one gram of a substance. (Tr. at 27).

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<sup>2</sup> The Coast Guard’s requirement of a 30 microsecond delta is narrower and thus more precise than the manufacturer’s suggestion of 50 microseconds. (Tr. at 159).

<sup>3</sup> Brown did not state the unit of measure used in the height analysis.

<sup>4</sup> This unit of measure is alternatively referred to as “bundles” or “windows”.

Brown testified that there are currently fifty thousand ion scan devices in use throughout the world which are used for a variety of purposes, including drug detection, explosives detection, and quality control in chemical manufacturing. (Tr. at 9). He testified that there is a scientific journal devoted to the technology, and over 1000 peer-reviewed articles on the technology have been published in the chemistry literature over the last fifteen years. (Tr. at 10-11). According to Brown, peer-reviewed articles have concluded that the technology, as used in the drug detection field, has a low detection limit making it very sensitive, is very selective as to the specific drug being analyzed, is easy to use, and has a low error rate. (Tr. at 12-13). He stated that customs, DEA, and other Canadian and American law enforcement officials have found the technology reliable in detecting drug residue on currency, documents, packages, vessels, and visitors to prisons. (Tr. at 30).

Brown testified that the ion scan technology has an error rate “so low as to be called negligible in most of the peer-reviewed literature.” (Tr. at 11). The technology has a very low rate of false positives, with “almost no capability” of setting off its alarm for a chemical substance not actually present in the sample. (Tr. at 11). He testified that a false negative was more likely than a false positive due to the manner in which the Coast Guard collects samples. (Tr. at 11-12). Brown testified that the ion scan technology is “generally accepted in the field.” (Tr. at 10).

### **C. Coast Guard Use of Ion Scan Technology**

Brown described the Coast Guard’s use of the ion scan technology. The Coast Guard considered a variety of technologies, including gas and liquid chromatography, mass spectroscopy, and a variety of radiation techniques for the purpose of locating trace amounts of drugs on vessels at sea, and ultimately selected the ion scan instrument, using ion mobility spectroscopy, as the most effective technology. (Tr. at 6). He testified that one of the reasons the Coast Guard chose to use the ion scan device was because the movement of a vessel on the high seas does not affect the instrument’s internal calibration or other workings. (Tr. at 70). Brown testified that the DEA confirms tests with the gas chromatography mass spectrometer (“G.C. mass spec.”), which is considered the “gold standard” technology. (Tr. at 41-42). The G.C. mass spec. cannot work on boats, however, so the Coast Guard uses the ion scan for that purpose. (Tr. at 41). Unlike the ion

USA vs. Hernández-de la Rosa, et al.  
Criminal No. 08-037 (CCC)  
OPINION AND ORDER

Page 5

scan, the G.C. mass spec. is able to perform “fingerprinting” of the drug, that is, to determine that one sample of drugs matches another sample. (Tr. at 46).

Brown explained how, as a practical matter, the ion scan enables the Coast Guard to detect cocaine residue. The outer wrappings of cocaine bales typically become contaminated with cocaine residue through the packaging process (not through leakage). (Tr. at 19-20). The residue sticks to rough, porous surfaces, such as wood and fiberglass in a boat. (Tr. at 20). After individuals have handled the bales, the residue often sticks to their hands, as well as to their chest and thighs once they have clutched a bale to their person. (Tr. at 20, 142). The residue can then also be found on whatever their hands have touched, including their pockets, cellular telephones, and the controls of a boat. (Tr. at 20-21, 142).

Brown described the calibration systems of the ion scan device. He testified that if the automatic calibration system fails, the machine’s electronic controls will not allow the operator to proceed to conduct the tests. (Tr. at 71). As part of its operating procedures, the Coast Guard performs calibration tests prior to each use to ensure that the machine is properly calibrated and results cannot be falsified. (Tr. at 13, 16). He said that the ion scan can be calibrated with a liquid standard, but that liquid was difficult to use onboard a vessel so the Coast Guard worked with the manufacturer (Smith’s Detection) to develop what it refers to as the “lipstick” standard (based on the appearance of the substances packaged in lipstick-like tubes). (Tr. at 16, 69). The first lipstick, a non-drug standard known as the “blue lipstick,” is a compound containing three non-illegal drugs for an initial verification. (Tr. at 17, 22). The second lipstick, a three-drug standard known as the “purple lipstick,” contains cocaine, heroin, and methamphetamine to test that the machine is properly calibrated to detect these drugs. (Tr. at 17, 22).

The Coast Guard employs a set of operating procedures listed on a checklist that the operator must complete prior to each use of the device. Brown testified that the Coast Guard developed this checklist of procedures to be used just prior to and during each use of the machine in order to ensure that it is correctly set up for operation. (Tr. at 115). The procedures include step-by-step testing of the machine’s controls, air flows, and calibration. (Tr. at 21-22). Calibration is verified with the

USA vs. Hernández-de la Rosa, et al.  
Criminal No. 08-037 (CCC)  
OPINION AND ORDER

Page 6

lipstick test, such that if the machine is properly calibrated, the non-drug standard should trigger alarms for three non-drug substances and the three-drug standard should trigger alarms for each of the drugs it contains. (Tr. at 22). The Coast Guard's procedures also require the operator to test the area where the machine is set up, his own person, the test supplies, and the boarding team to ensure there is no residue on them that could affect the test results. (Tr. at 23).

Once these tests are completed, the boarding team boards the suspect vessel and takes samples from the boat and the individuals onboard. (Tr. at 23). Each member of the boarding team places 5-10 latex gloves on one hand in order to facilitate the collection process, whereby the sample is placed in a glove which is pulled off inside-out and tied with the sample inside, thus exposing a clean latex glove which can be used to collect the next sample. (Tr. at 24). The operator logs the samples based on the description of each sample provided by the sample-taker. (Tr. at 24-25). Although the instrument may be connected to a printer (as it often is in a laboratory setting), in regular Coast Guard field unit practice the operator records the ion scan results by hand rather than by printing them. (Tr. at 51).

Brown explained that the Coast Guard uses chemical filter paper (the "filter paper") to collect samples because the filter paper is clean and the results were reproducible, even though swabs of different materials could be used with the device. (Tr. at 66-67). Brown explained that the filter papers are the size of the top of a soda can, but only a nickel-sized area of the paper is tested.<sup>5</sup> (Tr. at 25). Testing this small spot may result in false negatives. (Tr. at 25).

On cross-examination, defendants questioned Brown as to the proper maintenance and life-span for the ion scan instrument. (Tr. at 35). Brown testified that the life span is based on the ionization source and internal calibrant, and he has used a particular instrument for over ten years without encountering any problems. (Tr. at 35). Maintenance is performed as needed, rather than

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<sup>5</sup> This process also allows the test to be repeated, although Brown testified that he had not re-tested the samples collected from the El Progreso. (Tr. at 160-61). He stated that it is not the regular practice of the Coast Guard to retest samples, but rather the Coast Guard gives the samples to the prosecutors and leaves it to their discretion to determine whether additional verification is needed in the particular case. (Tr. at 162).

by adhering to a periodic maintenance schedule. (Tr. at 38, 59). An operator will be able to determine that a machine is operating properly so long as it successfully passes the calibration and other tests routinely performed at the beginning of each operation. (Tr. at 60).

The instrument can become dirty with diesel fuel and other environmental contaminants, in which case an operator would perform a cleaning process to deal with any problems that were created. (Tr. at 36). Machine parts are changed only when false positive results appear on tests of blank filters, indicating that there is contamination inside the machine. (Tr. at 66). The device should be kept in a location with stable electrical power and air-conditioning to help minimize the humidity. (Tr. at 25). While low humidity is preferable, the machine contains an internal drying agent, known as drierite, to remove moisture as necessary. (Tr. at 40). Brown explained that drierite changes color to indicate when it needs to be changed. (Tr. at 62). A capsule of drierite is located on the back of the machine where it can be easily viewed by the operator, who checks the color as part of his pre-operation procedures. (Tr. at 65). Brown stated that a machine could be working properly even if the drierite were changed more than once per month if the device was used in more humid conditions or if the drierite was changed for training purposes. (Tr. at 64-65).

#### **D. As-Applied Opinions**

Captain Brown also testified to his opinions of the technology as applied to the specific facts of this case.<sup>6</sup> The government showed Captain Brown Exhibit 1, the Ion Scan Operator's Guide and Calibration Sheet, dated January 26, 2008 (the "checklist").<sup>7</sup> (Tr. at 113). He stated that this

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<sup>6</sup> Captain Brown did not testify to the "as applied" opinions in his initial testimony but was recalled to testify to these views after the government informed the court that at trial it planned to offer Captain Brown's testimony on such opinions. (Tr. at 97). The court noted that the government's Rule 16 disclosures had not disclosed Brown's opinions on those matters. (Tr. at 97-98). The government represented that they had previously served defendants with the documents on which Brown's testimony on these issues would be based. (Tr. at 99). The court held that defendants would not be prejudiced by Brown's testimony on these issues, noting that they had already attempted to cross-examine him on his as-applied opinions before he had offered direct testimony on them. (Tr. at 109).

<sup>7</sup> Defendants objected that Captain Brown was unable to authenticate Exhibit 1. The court admitted Exhibit 1 for the purposes of the Daubert hearing but noted that it would need to be properly authenticated in order to be admissible at trial. (Tr. at 112-13).



USA vs. Hernández-de la Rosa, et al.  
Criminal No. 08-037 (CCC)  
OPINION AND ORDER

Page 8

document was the checklist he had described earlier, as used for testing the samples collected from the El Progreso in this case. (Tr. at 113). On cross-examination, Brown stated that there was no way to corroborate the checklist. (Tr. at 148). He described the list of items on the checklist, each of which was answered affirmatively and marked with the initials of Petty Officer Normand Medeiros, the ion scan operator on duty. (Tr. at 113-127). The first two questions required Medeiros to examine the air connections and air purification (the drierite drying agent) in the instrument. (Tr. at 114, 116). The third question required him to turn on the machine and determine whether the start-up was satisfactory. (Tr. 116). The fourth question asked whether the indicator lights and LED screen on the instrument powered on properly. (Tr. at 118-19).

The next part of the checklist concerned the various calibration tests. The first analysis checked the air flow and pressure in the instrument using blank filter paper. (Tr. at 119). Next, an auto-calibration analysis ran a test using the non-drug standard blue lipstick to ensure that the machine alarmed for those three verification compounds. (Tr. at 121-22). Brown explained that after every positive test, the checklist instructed the operator to “run a blank,” or run a test using blank filter paper to ensure that the previous sample had not left a contaminant or residue in the instrument that would remain detectable on the next test. (Tr. at 122-23). The next item instructed the operator to run the three-drug standard purple lipstick to ensure that the instrument alarmed for the three substances in that standard (cocaine, heroin, and methamphetamine). (Tr. at 123). This test was followed by another blank. (Tr. at 124). The checklist then instructed the operator to test himself to ensure that he was not contaminated. (Tr. at 124-25). Next, he checked the materials in the boarding kit that would be taken to the suspect vessel, the El Progreso, his working area, the instrument itself, and finally, the boarding team members.<sup>8</sup> (Tr. at 125-27). Brown testified that based on the responses to the questions on the checklist, he concluded that the instrument was operating properly and was being used properly on the day in question. (Tr. at 128).

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<sup>8</sup> Brown stated that Coast Guard decontamination procedures required that if a boarding team member tested positively for controlled substances, he change his clothes and wash his hands six to ten times and be retested, or be removed from the boarding team if necessary. (Tr. at 127).



The government then showed Brown Exhibit 2, the sample log sheet dated January 25, 2008.<sup>9</sup> (Tr. at 129). Brown testified that this was the log sheet used by Medeiros for recording the results of the ion scan tests of samples taken from the El Progreso. (Tr. at 130). The sheet included columns indicating each of the three parts of the ion scan test: amplitude or peak height, delta or difference in time between when the peak arrived and when it was expected, and number of positive segments. (Tr. at 130). Other columns indicated the sample number, whether an alarm had triggered and which drug was detected, and the person or location from which the sample was taken. (Tr. at 130-31).

Brown reviewed the log sheet and summarized the results of each ion scan test reported on the log. Sample 1 was a “blank wipe” recording that there was no contamination in the instrument itself. (Tr. at 134). The results of the calibration test reflected an alarm for cocaine with a maximum amplitude of 642, delta of negative 5, and 15 positive segments.<sup>10</sup> (Ex. 2). The log sheet also records negative results for the work area and boarding officers Cintrón and Lees. (Ex. 2). Brown testified that, based on his conversations with the boarding officers, they followed proper procedures in collecting these samples, including seeking permission to inspect the vessel and collecting samples by placing them inside a latex glove which was then removed and tied to prevent contamination. (Tr. at 137).

Brown testified that he had learned from the boarding officers that samples 2, 4, 6, and 8 were taken from the El Progreso and tested the surfaces of the vessel itself. (Tr. at 136). The log

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<sup>9</sup> Defendants objected that Exhibit 2 contained markings in blue pen, and they had not received that version of the document. (Tr. at 28). The government stated that the document was Captain Brown’s personal copy and he had made the markings. Specifically, “/20” was written following the column “# SEG.”, which Captain Brown testified referred to the number in that column representing a number of segments out of a maximum of twenty. The court admitted the exhibit.

<sup>10</sup> Brown testified that, according to his conversations with Medeiros, Medeiros had recorded the results of the calibration and verification tests (previously performed according to the checklist) starting at sample 10 on the log sheet, after recording the results of the samples taken from the El Progreso, because “[a]s he saw the other samples were coming up positive for cocaine, he thought it was significant that he should write down what the instrument’s first test for cocaine was with the drug standard.” (Tr. at 136). Defendants did not make any objections or arguments relating to the order in which the test results were recorded on the log.

USA vs. Hernández-de la Rosa, et al.  
Criminal No. 08-037 (CCC)  
OPINION AND ORDER

Page 10

recorded that samples 2, 4, 6, and 8 (each followed by a blank wipe) each detected cocaine, recording results of a maximum amplitude ranging from 83 to 358, a delta ranging from 6 to 23, and a number of positive segments ranging from 6 to 18. (Ex. 2). He testified that the results for samples 2, 4, 6, and 8 indicate the presence of cocaine “with very high confidence” but “not in a huge concentration.” (Tr. at 143). His understanding was that the low concentration was based on the type of surface from which the sample was taken, explaining that the wooden surfaces of the vessel do not “give up” the drug residue very easily to the filter paper on which the Coast Guard collects samples. (Tr. at 143). He concluded that the results were “consistent with [] cocaine having been on those parts of the vessel sometime in the recent past.” (Tr. at 143). On cross-examination, he clarified that this meant that drugs had been on board within one to two days, or a week at most, and in particular, since the last time it rained or the boat was washed. (Tr. at 168).

Samples 15, 17, 19, and 21 (each followed by a blank wipe) record the tests for each of the individuals on board the El Progreso, referring to them as Migrants 1-3 and Master (master of the vessel). (Ex. 2; Tr. at 138-41). Sample 15, described as “Migrant 3,” had a maximum amplitude of 795, delta of 17, and 18 positive segments. (Ex. 2). Brown testified that a positive result for maximum amplitude requires only that it be greater than fifty, and 795 is close to the maximum reading possible by the machine. (Tr. at 139). He testified that the positive segments figure was even more important to him than the amplitude figure because it indicated that there was a sufficient quantity of cocaine on the sample that it required almost the full duration of the analysis to vaporize all of the residue off of the paper. (Tr. at 139-40). He stated that the segments figure, “with my experience in the instrument, is a more important indicator of how much drug residue [there was] than the actual amplitude itself.” (Tr. at 139-40).

Brown then reviewed the ion test results for the other individuals on board the vessel (Ex. 2; Tr. at 140). Sample 17, identified as Migrant 1 and recording an alarm for cocaine, registered results of a maximum amplitude of 795, delta of 19, and 20 positive segments. (Ex. 2). Brown concluded that this test again indicated “a large amount of cocaine residue found on that sample.” (Tr. at 140). Sample 19, described as Migrant 2 and recording an alarm for cocaine, recorded results

USA vs. Hernández-de la Rosa, et al.  
Criminal No. 08-037 (CCC)  
OPINION AND ORDER

Page 11

of a maximum amplitude of 847, delta of 8, and 20 positive segments. (Ex. 2). According to Brown, these results “indicat[e] a large amount of cocaine that persisted throughout all the tests that the instrument ran.” (Tr. at 141). Sample 21, identified as “Master” and recording an alarm for cocaine, recorded results of a maximum amplitude of 645, delta of 28<sup>11</sup>, and fifteen positive segments. (Ex. 2). Brown testified that these results were “not quite as high as the previous three tests, but still a substantial positive result for cocaine.” (Tr. at 141). On cross examination, Brown testified that his review of the results indicates that the results were not false positives because the samples taken from the Coast Guard boarding team came up negative but the samples taken from the vessel and individuals on the vessel came up positive. (Tr. at 159).

He stated that his testimony was based on reviewing the reports and listening to an interview with officers conducted by counsel for the government. (Tr. at 154). He had not personally interviewed any of the officers involved in the boarding and sampling of the El Progreso. (Id.).

## LEGAL DISCUSSION

### A. Admissibility Under Daubert

The Supreme Court in Daubert v. Merrell Dow Pharmaceuticals, Inc., held that district court judges act as gatekeepers in ensuring that all expert testimony admitted at trial is both relevant and reliable. 509 U.S. 579, 589 (1993). Under Daubert, district courts are required to engage in a flexible inquiry to determine the reliability of scientific evidence, considering factors such as whether the theory or technique has been and may be tested, whether it has been subjected to peer review and publication, the known or potential rate of error, the existence and maintenance of standards controlling the technique’s operation, and the “general acceptance” of the theory or technique within the scientific community. Id., at 593-95. The Federal Rules of Evidence were amended to codify this decision and its progeny. See Fed. R. Evid. 702 Advisory Comm. Note to 2000 Amendments. In its current form, Rule 702 provides:

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<sup>11</sup> The court observes that this figure appears to be a delta, or difference, of thirty-three (greater than the Coast Guard maximum of thirty) from the delta of negative five for the known cocaine used in the calibration test recorded at sample 10. Brown did not testify – and was not asked – whether this had any scientific significance.

USA vs. Hernández-de la Rosa, et al.  
Criminal No. 08-037 (CCC)  
OPINION AND ORDER

Page 12

If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise, if (1) the testimony is based on sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.

Fed. R. Evid. 702. However, Daubert does not require that a party proffering expert testimony convince the court that the expert's assessment of the situation is correct, but rather, "[a]s long as an expert's scientific testimony rests upon 'good grounds ....', it should be tested by the adversary process – competing expert testimony and active cross-examination – rather than excluded from jurors' scrutiny for fear that they will not grasp its complexities or satisfactorily weigh its inadequacies." Ruiz-Troche v. Pepsi Cola of Puerto Rico Bottling Co., 161 F.3d 77, 85 (1<sup>st</sup> Cir. 1998) (citing Daubert).

Daubert and Rule 702 also require that expert testimony carry a heightened degree of relevance. Based on the language in Rule 702 that expert testimony must "assist the trier of fact to understand the evidence or to determine a fact in issue," courts have explained that such testimony must have "a valid scientific connection to the pertinent inquiry as a precondition to admissibility." Daubert, 509 U.S. at 592. The First Circuit has explained that "expert testimony must be relevant not only in the sense that all evidence must be relevant [under Rule 402], but also in the incremental sense that the expert's proposed opinion, if admitted, likely would assist the trier of fact to understand or determine a fact in issue." Ruiz-Troche, 161 F.3d at 81.

Defendants raised two principal arguments in their motion as to why the ion scan results, and Captain Brown's testimony interpreting them, should be excluded: (1) the ion scan evidence does not meet the heightened relevancy requirements of Rule 702 and Daubert because that evidence does not prove that the cocaine later located on the alleged transfer vessel was the same cocaine that had left a residue in the El Progreso, and (2) the evidence is more prejudicial than probative under Rule 403. (Docket No. 70-2). At the hearing, defendants raised the additional arguments that Brown is not an appropriate expert because he neither designed the machine nor used it in this case (Tr. at 76), and the technology does not satisfy the reliability component of the Daubert inquiry. (Tr. at 83).

USA vs. Hernández-de la Rosa, et al.  
Criminal No. 08-037 (CCC)  
OPINION AND ORDER

Page 13

These issues will be addressed in turn.

**B. Relevancy and Fit**

The First Circuit has explained that in order for scientific evidence to be admissible, Rule 702 “requires a valid scientific connection to the pertinent inquiry as a precondition to admissibility.” Ruíz-Troche, 161 F.3d at 81 (citing Daubert, 509 U.S. at 592). The “pertinent inquiry” here is whether defendants intended to distribute cocaine or were engaged in a conspiracy to import cocaine. (Docket No. 28). Defendants suggest that there is not a “valid scientific connection” between the ion scan test results and the elements of the charged offenses because the defendants could have used or possessed cocaine without intent to distribute or import, or the cocaine could have been carried on board the vessel on this or another voyage without these particular defendants having been involved in the distribution or importation of the drug. The evidence, as Brown interpreted the test results, shows that a large amount of cocaine residue was found on samples taken from each defendant and produced test results close to the maximum capable by the device. (Tr. at 139-40). Brown described specifically how the number of positive segments in the results of samples tested from the defendants showed a high degree of cocaine residue. (Id.). He did not testify – and was not asked – whether these amounts could be detected on cocaine users or only people trafficking large quantities of the drug. With respect to the vessel itself, Brown testified that he concluded from the ion scan results that cocaine had been on board within one to two days, and a week at most. (Tr. at 168). This testimony is sufficient to link the evidence with facts at issue in the case.

As defendants point out, the ion scan is unable to perform a “fingerprinting” function tying the cocaine residue detected by the ion scan to the specific cocaine bundles the Coast Guard located on board the alleged transfer vessel. (Tr. at 46). However, this limitation alone does not defeat the ion scan’s ability to provide an important piece of the puzzle of the case the government must prove. As Brown explained, the technology is able to detect the presence of illegal drugs and analyze the relative quantity of such drugs present. The government, of course, must present much more evidence than this in proving their case, but this piece of evidence will “assist the trier of fact to determine a fact in issue” as the jury seeks to determine whether defendants were involved in the

USA vs. Hernández-de la Rosa, et al.  
Criminal No. 08-037 (CCC)  
OPINION AND ORDER

Page 14

possession or importation of cocaine. Ruíz-Troche, 161 F.3d at 81.

**C. Rule 403**

Defendants argue that even if the expert evidence satisfies the admissibility requirements of Rule 702, it should be excluded under Rule 403 because the jury would be confused by the point that the cocaine picked up in the ion scan test had not been proven to be the same cocaine as the bails of cocaine later seized by federal agents. Rule 403 provides that relevant evidence may be excluded “if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury . . . .” Fed. R. Evid. 403. The Supreme Court cautioned that even if expert evidence is admissible under Rule 702, it may not be admissible under Rule 403. Daubert, 509 U.S. at 595 (courts “should be mindful” of Rule 403 because “[e]xpert evidence can be both powerful and quite misleading because of the difficulty in evaluating it”) (internal citation omitted).

Nonetheless, “[v]igorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence.” Daubert, 509 U.S. at 596. The First Circuit emphasized that it is preferable for admissible expert testimony to “be tested by the adversarial process – competing expert testimony and active cross-examination – rather than excluded from jurors’ scrutiny for fear that they will not grasp its complexities or satisfactorily weigh its inadequacies.” Ruíz-Troche, 161 F.3d at 85 (citing Daubert, 509 U.S. at 590). Here, defendants’s concerns may be suitably addressed through the adversarial process. There is no question that the ion scan technique, as the First Circuit requires, “has been subjected to, and survived, the rigors of testing, publication, and peer review, and . . . won significant (if not universal) acceptance within the scientific community.” Id. Brown testified that the technology has been the subject of over 1000 peer reviewed articles, is used by various law enforcement agencies, and is “generally accepted in the field.” (Tr. at 10, 11, 30).

The issue of potential juror confusion again relates to the “fingerprinting” issue. Defendants’ concern, in essence, is that jurors will be so swayed by the scientific, technical evidence that they will be unable to distinguish the defendants’ connection to *some* cocaine from defendants’ alleged connection with the *particular* cocaine at issue here. However, echoing the First Circuit’s caution,

USA vs. Hernández-de la Rosa, et al.  
Criminal No. 08-037 (CCC)  
OPINION AND ORDER

Page 15

I do not believe jurors will be unable to grasp the complexities and limitations of the ion scan evidence. Brown's testimony in the hearing clearly described both the significance and limitations of the test results, and at trial defendants will have the opportunity to further bring these points to light through cross-examination or other evidence. I do not find an undue risk of juror confusion, as contemplated by Rule 403, here.

**D. Defendants' Additional Arguments**

Defendants also suggested at the hearing that Captain Brown's testimony should not be admitted because he did not test the samples himself, but relied on the results recorded by Petty Officer Medeiros. Defendants argue, in essence, that Brown, in forming his opinions, did not rely on "sufficient facts or data" under Rule 702. The First Circuit has rejected a similar argument that a medical expert's testimony was inadmissible in a medical malpractice suit because the expert did not himself inspect the x-ray and MRI films, but relied in his testimony on other doctors' reports of what those films revealed. Crowe v. Marchand, 506 F.3d 13, 16 (1<sup>st</sup> Cir. 2007). The court held that the testimony was admissible because the expert had performed an extensive investigation of the relevant medical records and reports and, moreover, it was the custom and practice of the medical profession for doctors to routinely rely on observations reported by other doctors. Id., 506 F.3d at 17. The court further noted that Rule 703 specifically permitted experts to rely on materials compiled by others when they are "of a type reasonably relied upon by experts in the particular field." Id., 506 F.3d at 18 (citing Fed. R. Evid. 703). Here, Captain Brown testified about the Coast Guard's general practices and procedures with respect to ion scan tests, as well as his own expertise conducting those tests and analyzing their results. He testified that the ion scan appeared to be performed consistently with Coast Guard procedures and there was no reason he could not interpret the results. Moreover, plaintiffs have not alleged that the ion scan results are inaccurate, and at trial will have the opportunity to cross-examine Petty Officer Medeiros concerning any potential inaccuracies resulting from his conduct of the test. See id., 506 F.3d at 18 n.1 (testimony based on reports created by others admissible because, "[i]n any event, the plaintiff has not alleged that the x-ray and MRI reports were in any way inaccurate").



Defendants also suggested that the ion scan technology was not sufficiently reliable to meet the Daubert standard. In the context of reliability, counsel argued that the device is not sufficiently precise, there could be human error in the results recorded by hand rather than printed, and Brown was unable to testify to the humidity conditions on the vessel. (Tr. at 83-84). First, counsel's statement that "the machine is not precise enough to . . . detect the substance" (Tr. at 83) runs directly counter to Brown's testimony concerning the instrument's high degree of precision in detecting controlled substances. (Tr. at 12-13, 30). In the absence of any contradictory evidence or impeachment testimony, counsel's argument is unconvincing. Moreover, defendants will have the opportunity at trial to cross-examine Medeiros regarding any concerns of "human error" in recording the test results and may raise these concerns for the jury to consider. Finally, while Brown could not testify to the actual humidity on January 26, 2008, he testified that a humid environment does not impede the functioning of the machine so long as the drying agent is functioning to remove moisture from the air inside the device. (Tr. at 40). Further, he testified that Coast Guard procedures, which Medeiros appeared to have followed (and can himself testify to at trial), require the ion scan operator to confirm that the drying agent is indeed properly functioning. (Tr. at 65).

While there are few federal cases directly considering the admissibility of ion scan evidence, those decisions addressing the issue are consistent with allowing its admission here. Decisions finding ion scan evidence inadmissible are easily distinguishable on their facts. The Third Circuit refused to admit ion scan evidence in a civil forfeiture proceeding relating to a currency seizure, holding that the government had not produced adequate evidence concerning the reliability of the test or the qualifications of the tester.<sup>12</sup> United States v. Ten Thousand Seven Hundred Dollars and No Cents (\$10,700.00), 258 F.3d 215, 231 (3d Cir. 2001). In particular, the government had not

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<sup>12</sup> The government here has not yet produced evidence concerning the qualifications of Petty Officer Medeiros, the ion scan operator in this case, but represented to the court that it intends to do so at trial. Medeiros need not qualify as an expert under Rule 702 so long as his testimony at trial is limited to describing his own experience, qualifications, and operation of the ion scan device in connection with the search of the El Progreso, and he does not testify to any opinions based on "scientific, technical, or other specialized knowledge". Fed. R. Evid. 701. In any case, that is a matter to be resolved by the presiding district judge at trial.

USA vs. Hernández-de la Rosa, et al.  
Criminal No. 08-037 (CCC)  
OPINION AND ORDER

Page 17

provided any explanation of how the test measures the levels of narcotics on the currency, what the test results showed with respect to level and type of narcotics detected, why those results were scientifically significant, or how the test was administered to ensure its reliability. Id. Instead, the government had provided only the test results and a graph which the government did not explain to the court. Id. In the context of an unreasonable search and seizure case, one appellate court found that, given the specific evidence before it concerning the manner in which the test was conducted, the ion scan results may have been unreliable. Gray v. Brown, 26 Fed. Appx. 819, 824 (10<sup>th</sup> Cir. 2001) (raising concerns that testers swabbed plaintiff's arm four times prior to obtaining positive result, testers did not wash their hands in between swabbings or touching other people, and testers did not use rubber gloves).

However, the concerns raised by courts in those cases have been adequately addressed by the government and do not apply here. Here, the government offered Brown's testimony explaining in extensive detail how the test measures the levels of narcotics on a suspect vessel and its crew, describing again in minute detail the results of the test, explaining the scientific significance of the test results, and describing the various procedures which the Coast Guard utilizes to ensure the reliability of the test results. The government's evidence here is a far cry from the government's simple attachment of test results without explanation in \$10,700.00. Likewise, the Eastern District of New York recently found the Third Circuit decision in \$10,700.00 "easily distinguishable" where "the government provided substantial evidence . . . as to all the items that the Third Circuit found to be lacking in the government's submission in that case", including establishing that the test was properly administered, showing that the test is reliable, and explaining the scientific significance of the results. Muñoz v. United States, 07-CV-2080 (ILG), 2008 U.S. Dist. LEXIS 57326, at \*201-02 (E.D.N.Y. July 28, 2008) (rejecting argument that counsel was ineffective in failing to challenge admission of ion scan evidence). Moreover, Brown's testimony also addresses the concerns raised by the 10<sup>th</sup> Circuit in Gray concerning the reliability of the results. He testified that Coast Guard procedures require multiple steps to prevent cross-contamination of results, such as using rubber gloves, testing the Coast Guard personnel, and running blank filters after every positive hit.

USA vs. Hernández-de la Rosa, et al.  
Criminal No. 08-037 (CCC)  
OPINION AND ORDER

Page 18

**CONCLUSION**

Based on the foregoing, defendants' motion in *limine* to exclude the ion scan evidence is **DENIED.**

**IT IS SO ORDERED.**

In San Juan, Puerto Rico, this 12<sup>th</sup> day of February, 2009.

*S/Bruce J. McGiverin*  
BRUCE J. McGIVERIN  
United States Magistrate Judge